

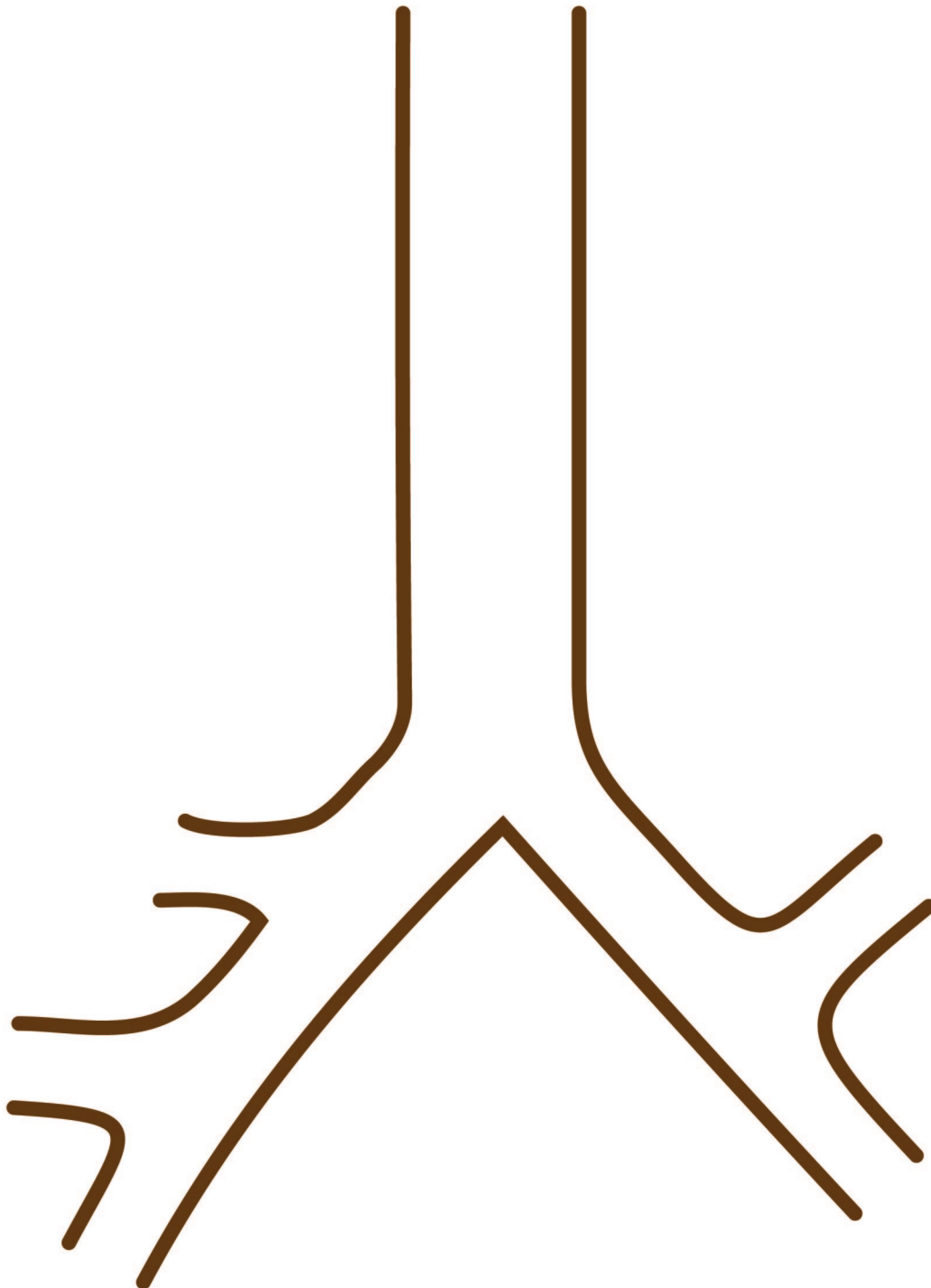
Persistence
& Creativity

Anatomy Comics, Objective 7.5



Simple
Comix

7.5 Identify the lobes of the right and left lungs. Identify impressions made on the surfaces of each lung by surrounding structures. Identify the surface projections of the fissures and lobes of the lungs, the heart, pericardium and the great vessels. Follow the course of a primary, secondary, and tertiary bronchus to at least one bronchopulmonary segment.



1. A 30 year old unconscious trauma victim has an endotracheal tube (ETT, red arrow) placed. His CXR is shown below. Where is the ETT tip?

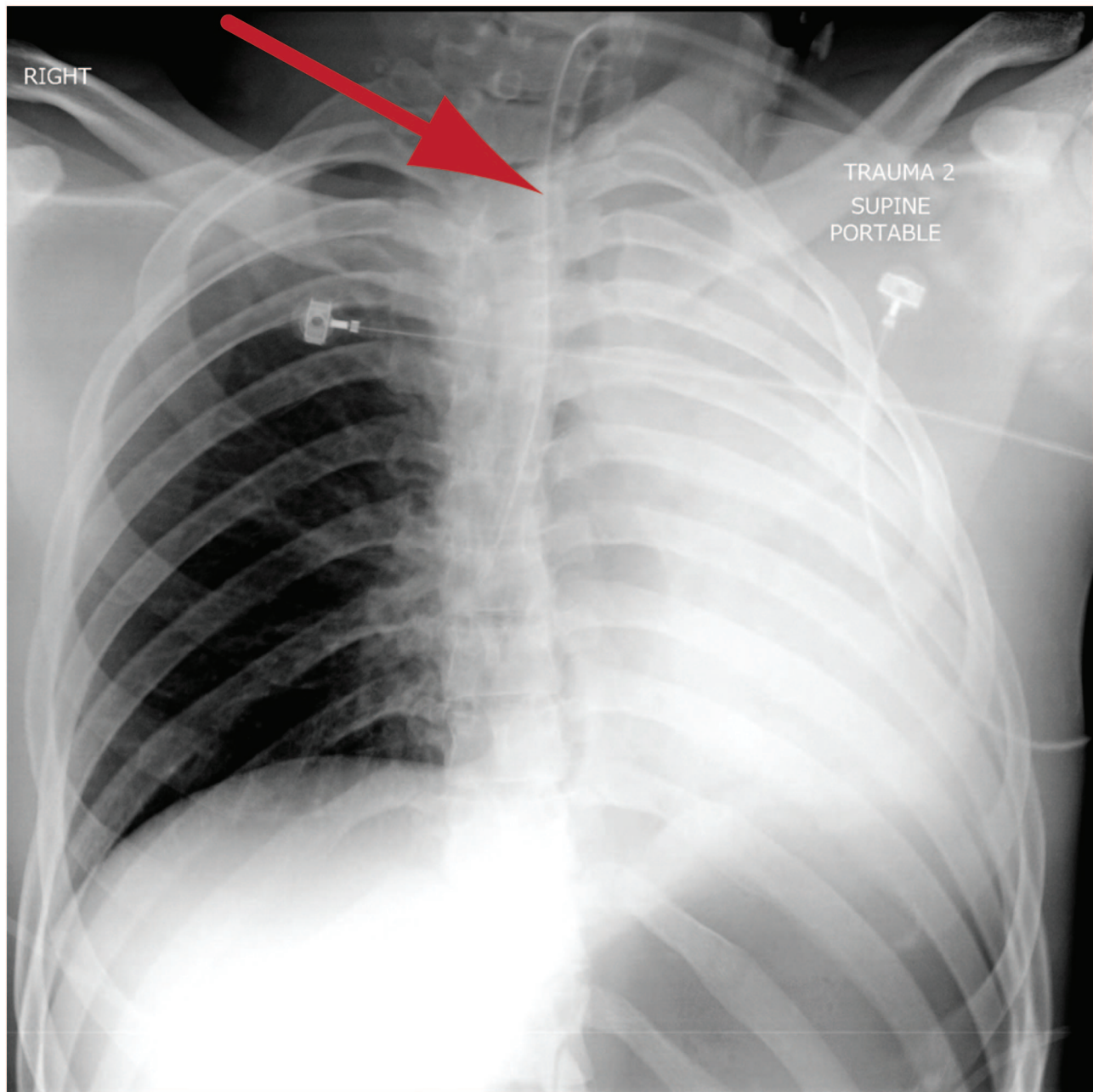
- A. Trachea
- B. Right main bronchus
- C. Left main bronchus
- D. Esophagus

2. Why is the left lung completely white?

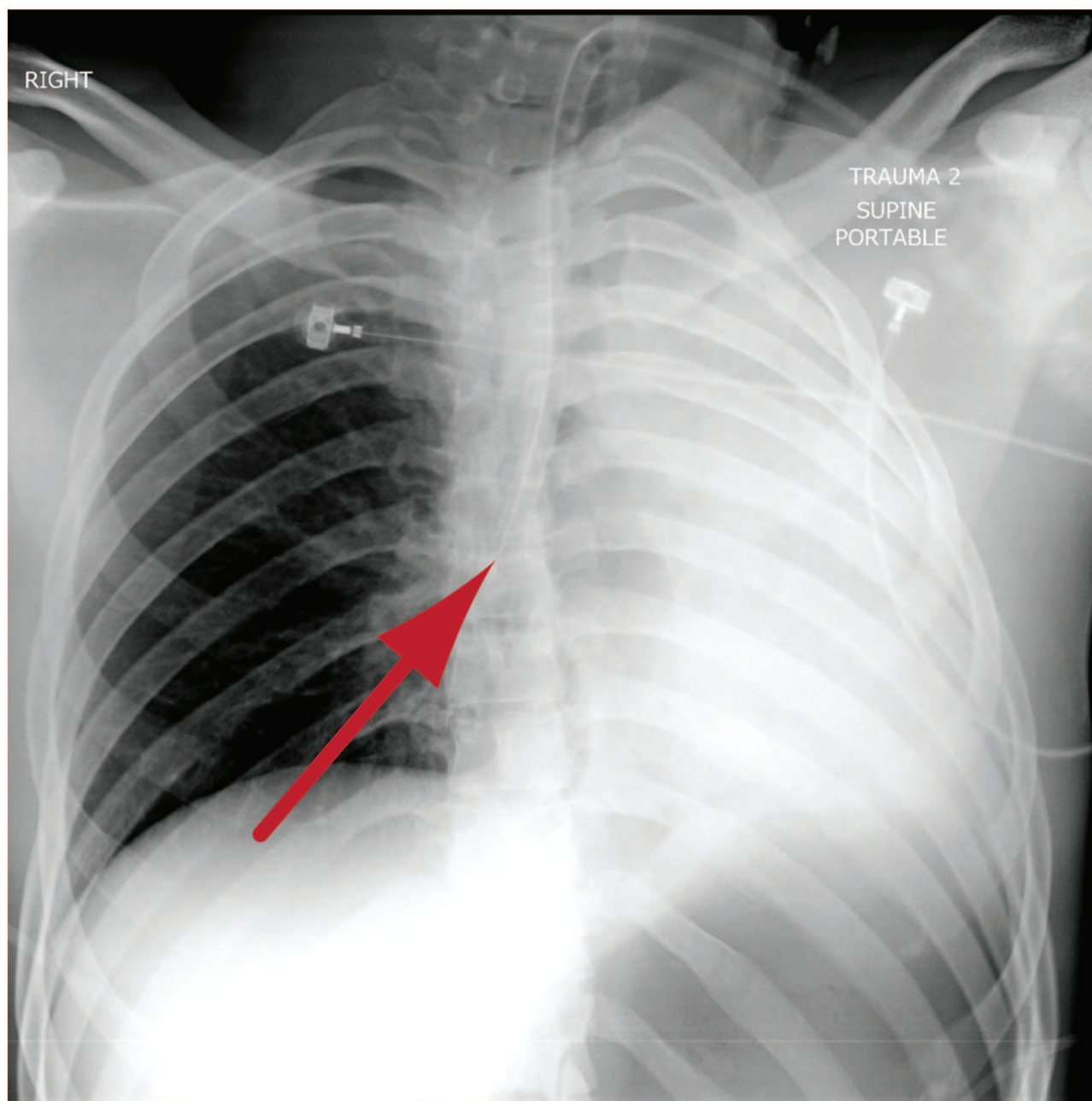
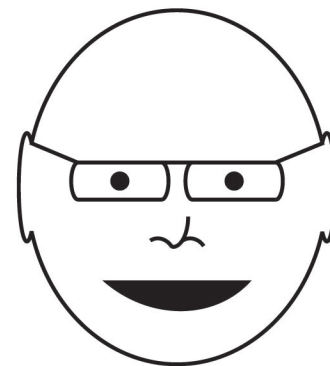
- A. It is filled with air
- B. It is filled with fluid
- C. It is deflated



Tough questions!

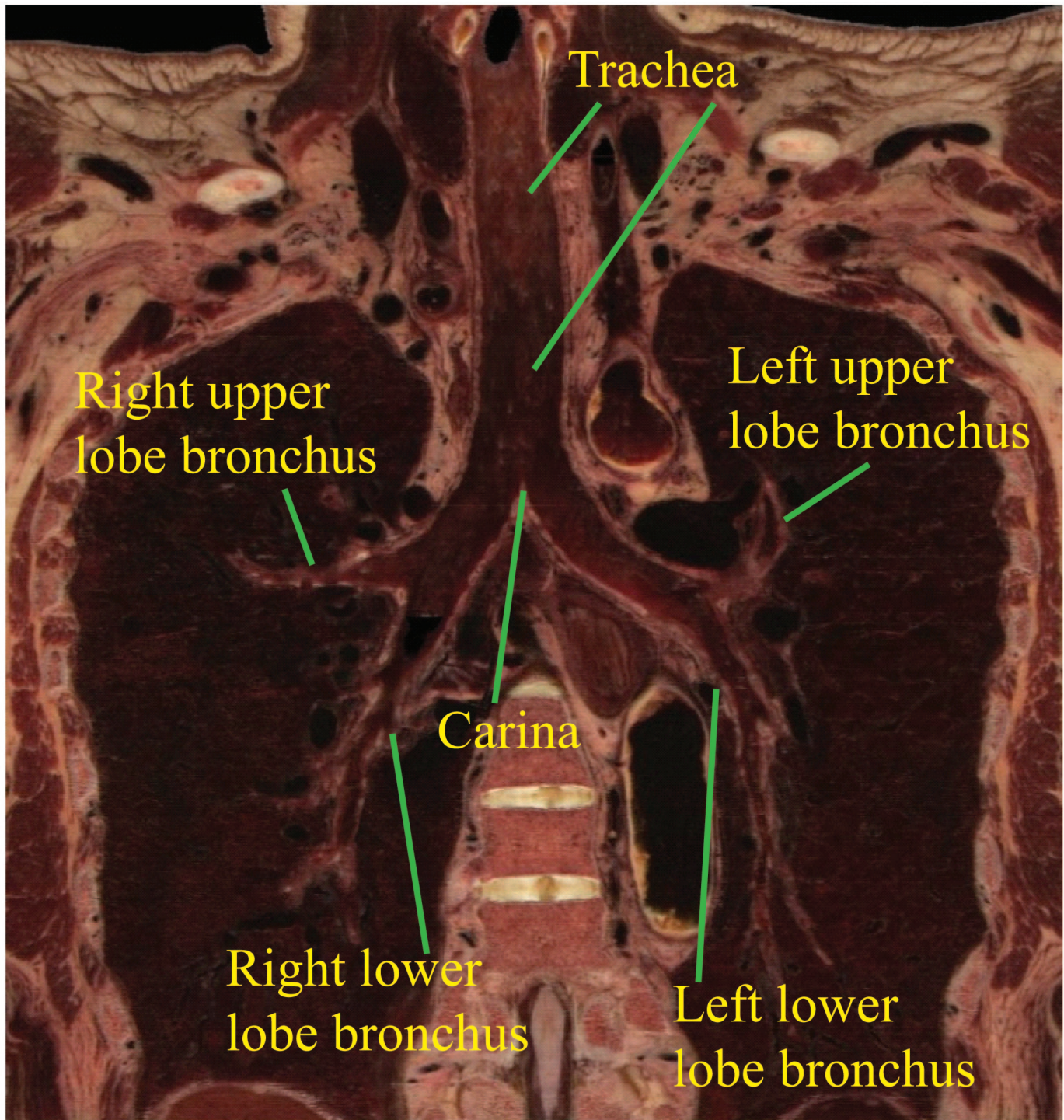


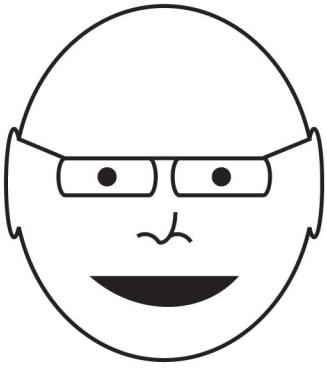
The ETT tip (red arrow) is in the right main bronchus. We'll run through the anatomy in the pages to come and show you why if the ETT is in the airway, the right main bronchus is the only place it can be. We'll also show you why you should consider an esophageal placement, but why in this case, that is incorrect. Finally, the left lung is white because it is deflated, and we will explain why. But we'll start with the anatomy, using images from the visible human project.



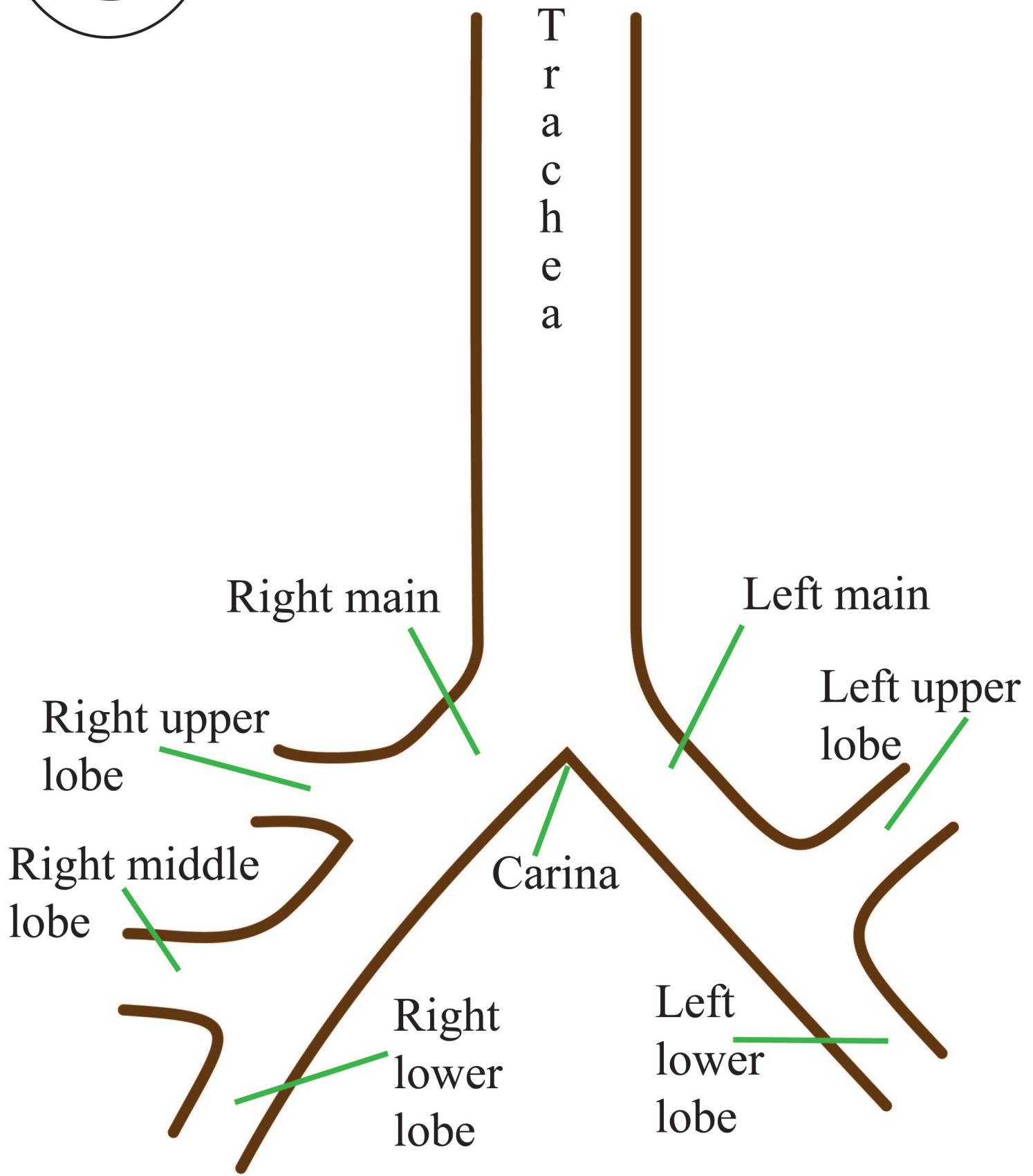


We'll start with an overview in the coronal plane that shows the trachea, the carina (that's where the trachea divides in 2), the main bronchi, 4 of the 5 lobar bronchi and several segmental bronchi. Next, we'll draw a picture showing this anatomy, then we'll go over the anatomy in the axial plane and finally, we'll circle back to our case and tie up some loose ends.



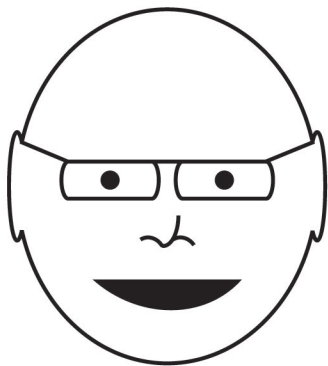
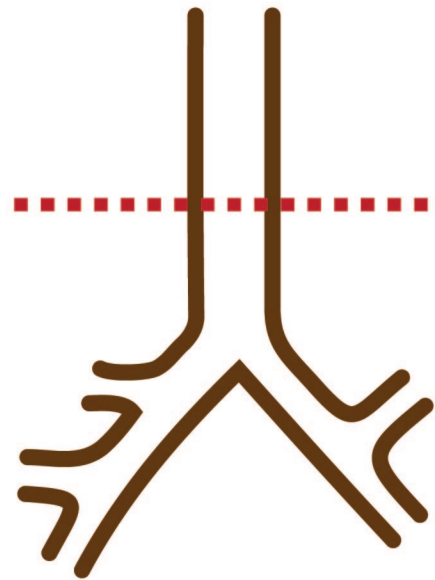


Let's draw and label the trachea, main bronchi and the 5 lobar bronchi. Go ahead and do it, it will make it easier to learn the anatomy.

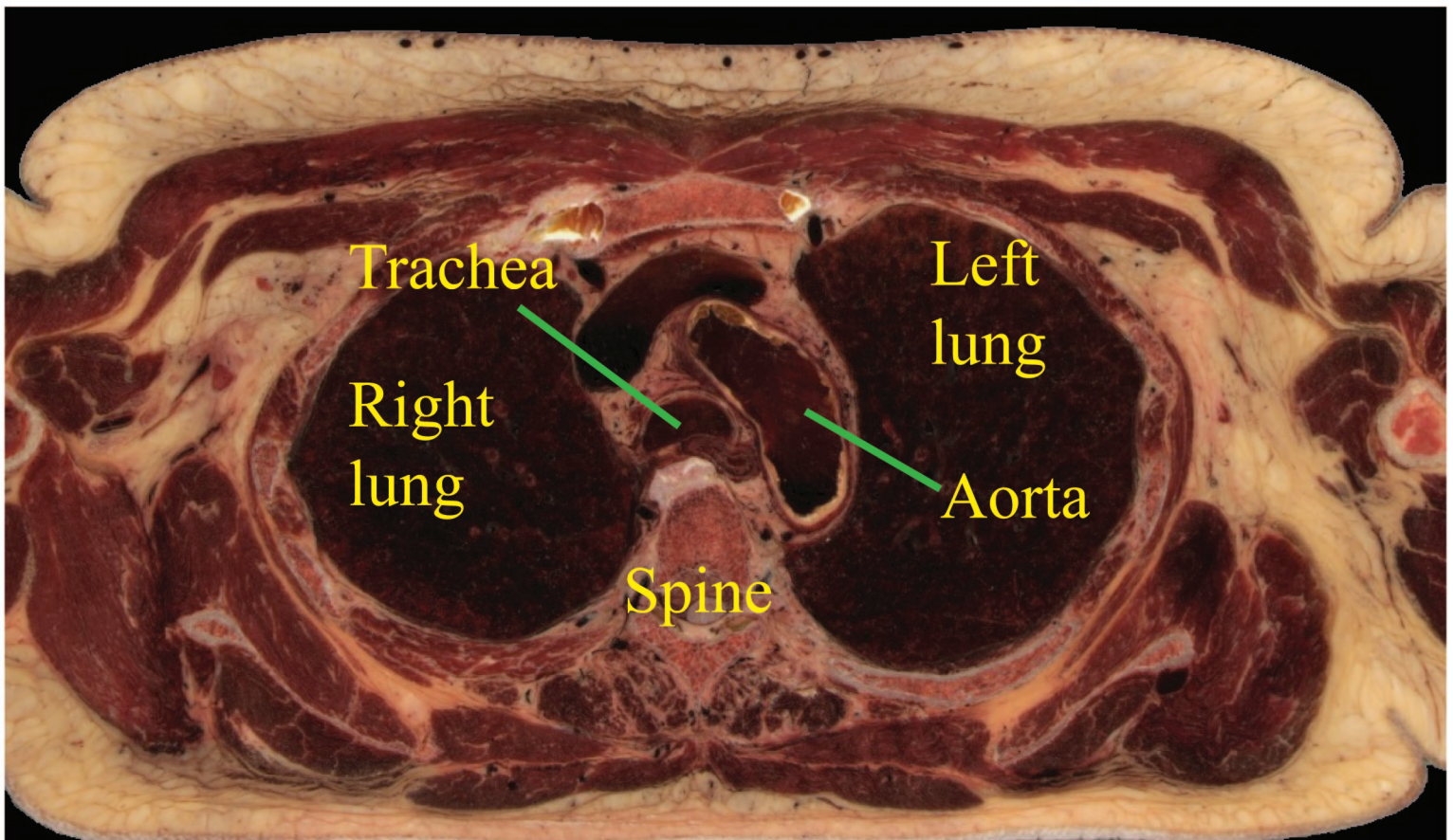


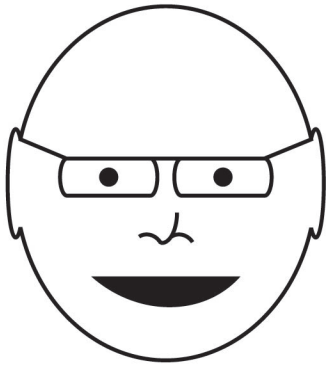


For the next few pages, we are going to march down the trachea to the main bronchi and we will visit all 5 lobar bronchi. Along the way, we will take a look at some segmental bronchi. On the tracheobronchial tree drawing at right, the red dotted line marks the plane of section of the image at bottom.

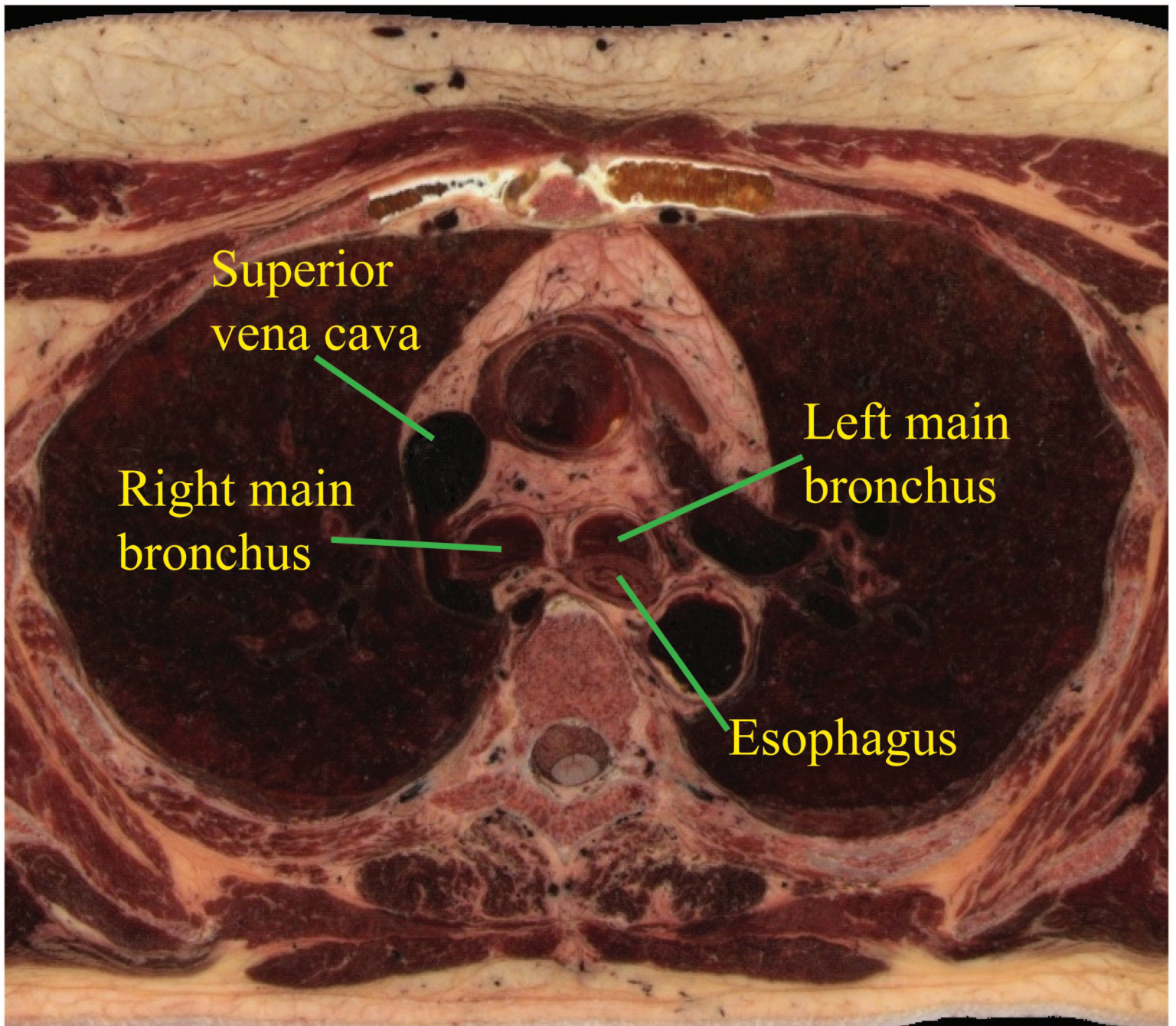
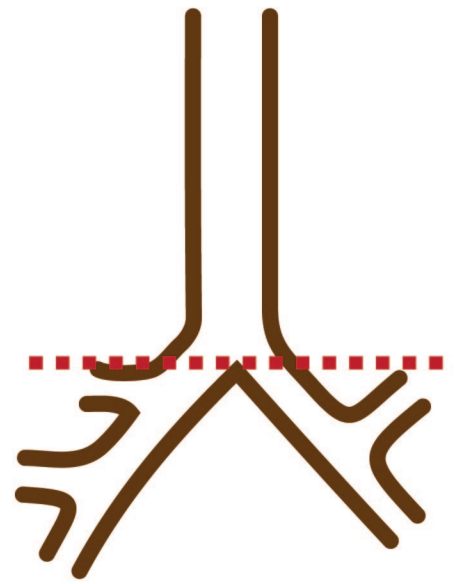


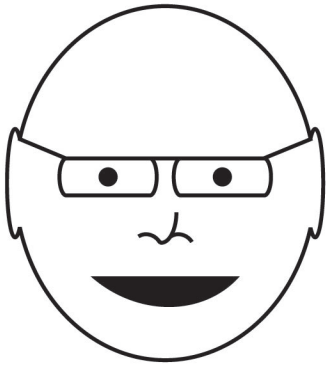
I've gone ahead and labeled some other structures as well, you may as well learn them now.



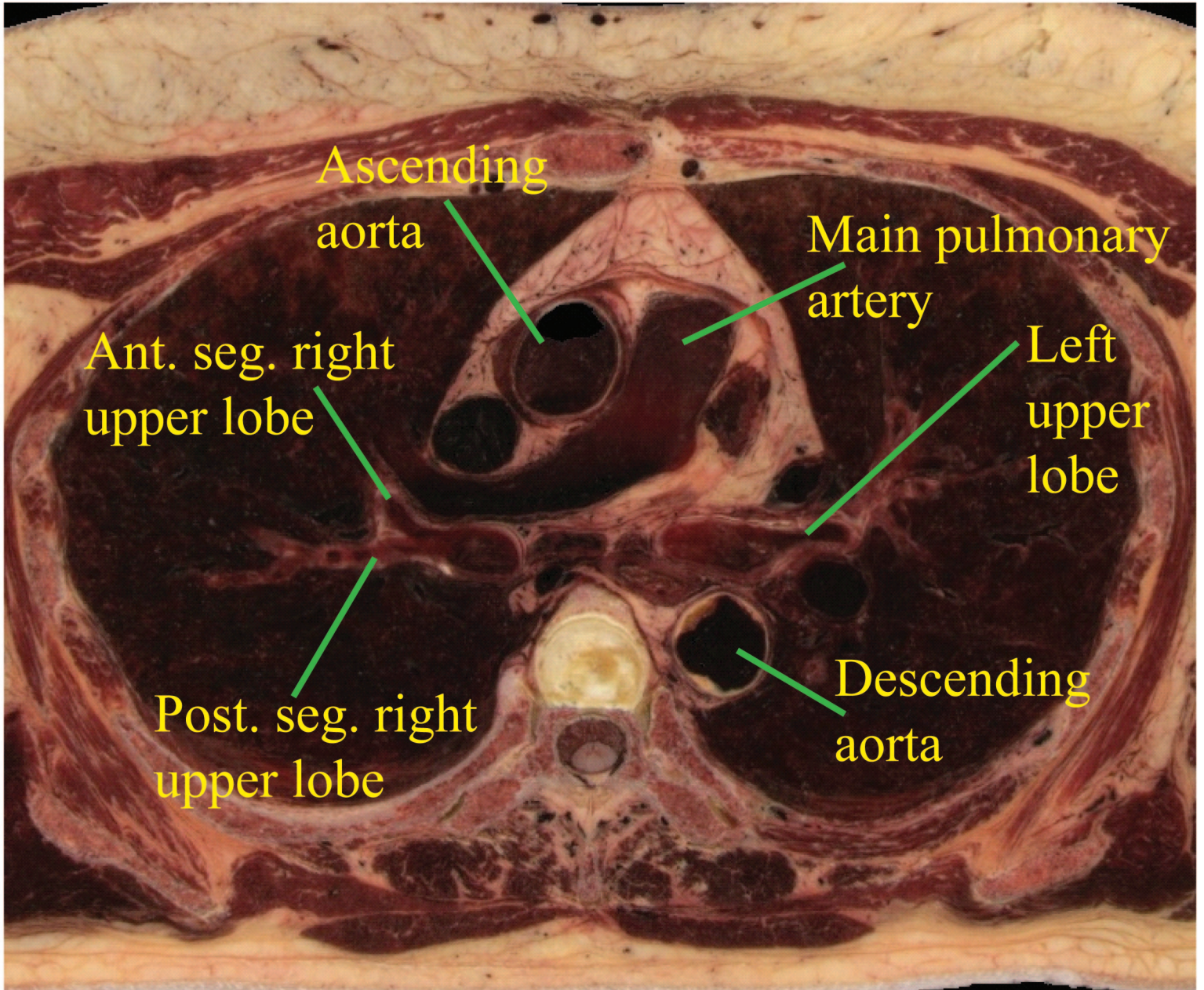
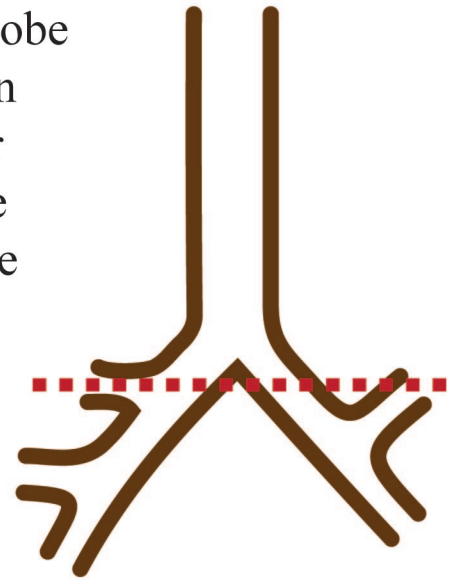


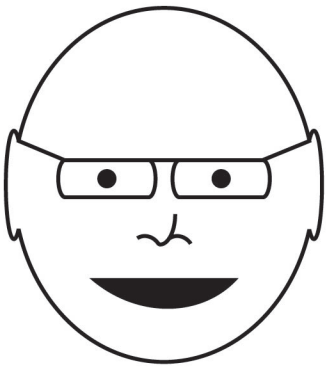
I have cropped this image so we can concentrate on the airway and surrounding structures. This image was obtained at the level of the carina.





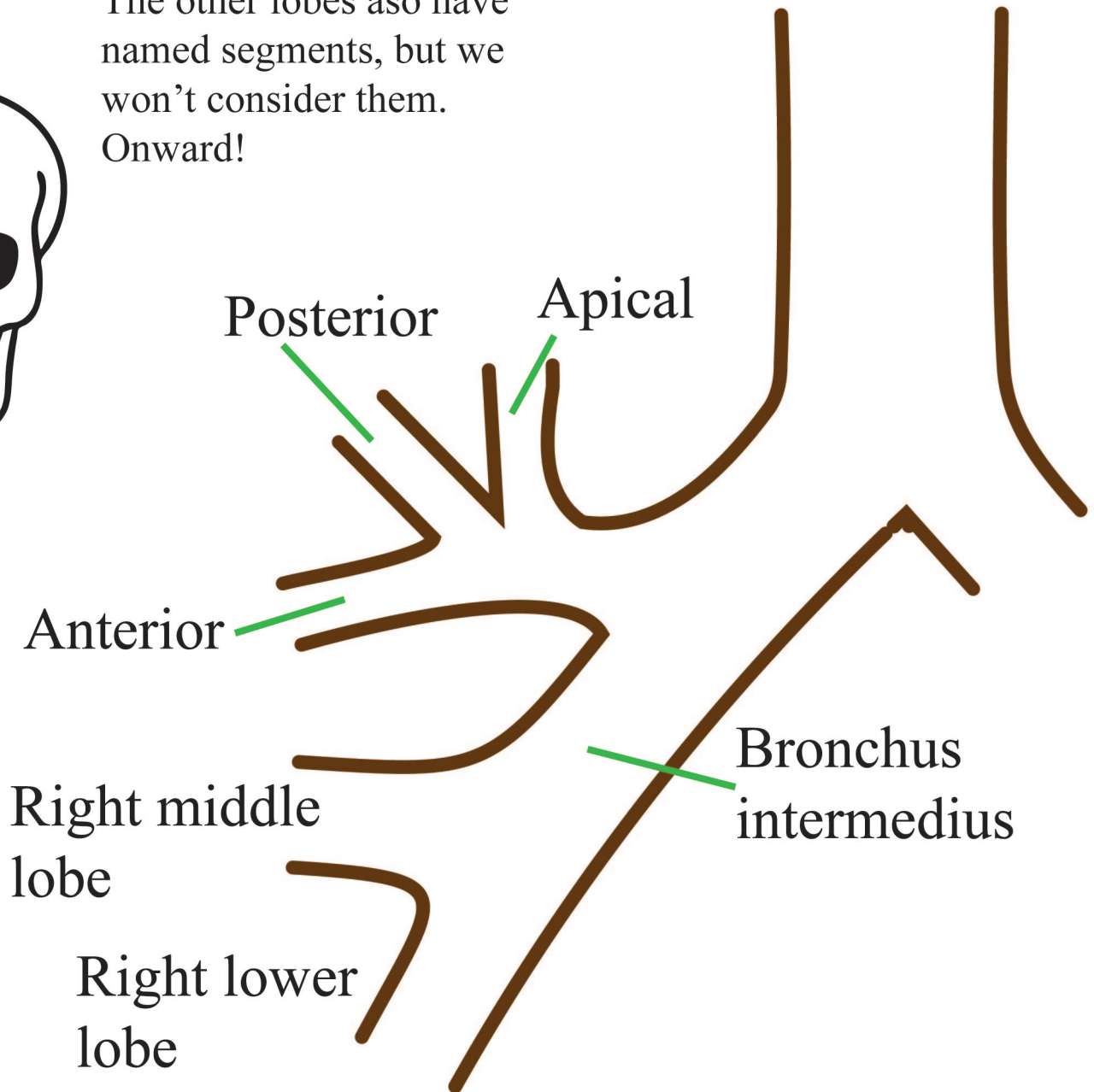
The next section is obtained at the origin of the right upper lobe bronchus. On this slice, we can see the origins of the anterior and posterior segments of the right upper lobe as well as the left upper lobe bronchus.

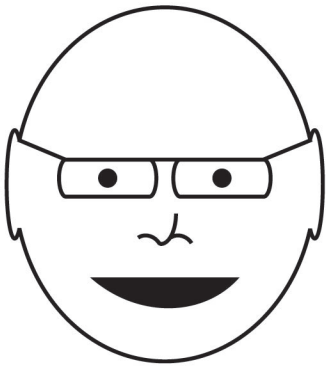




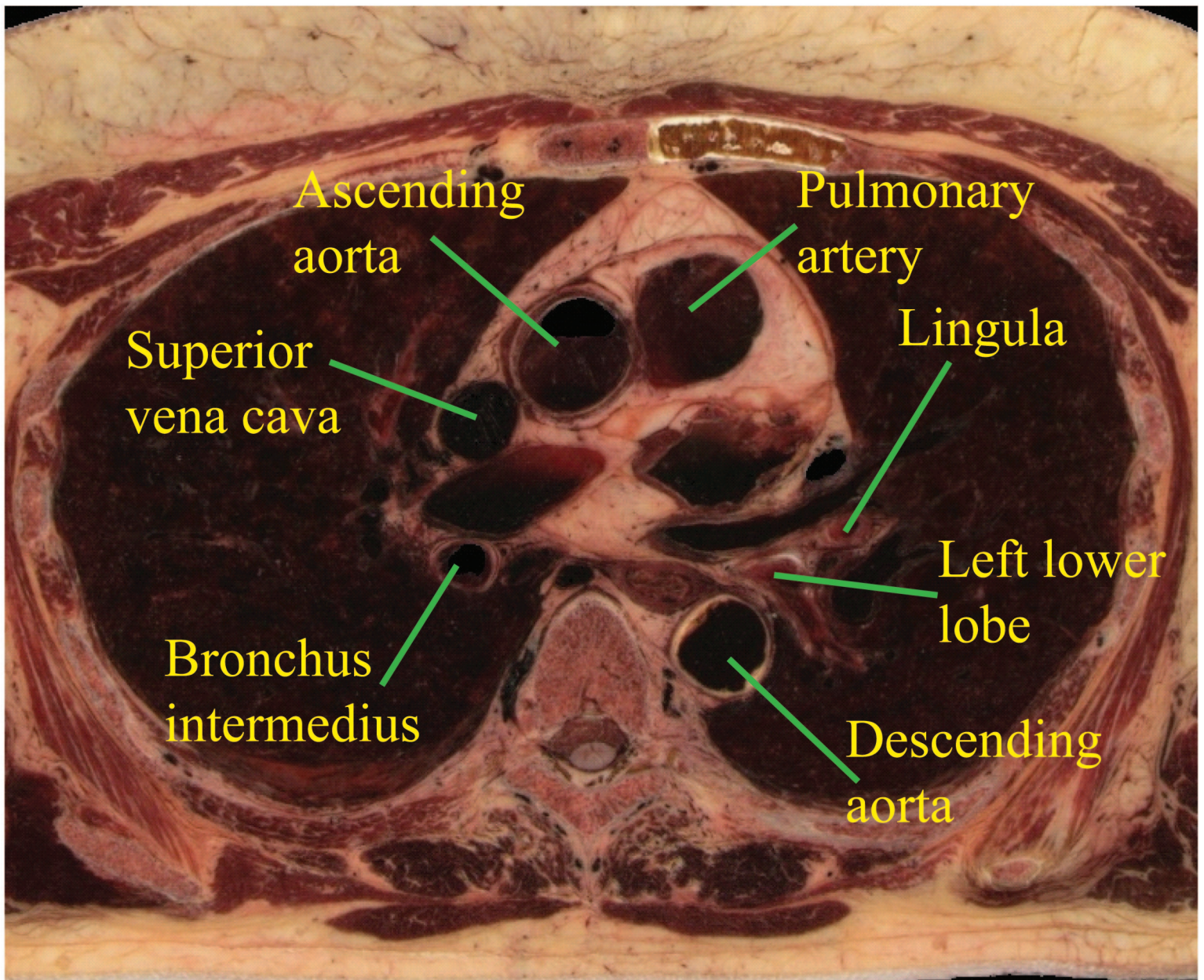
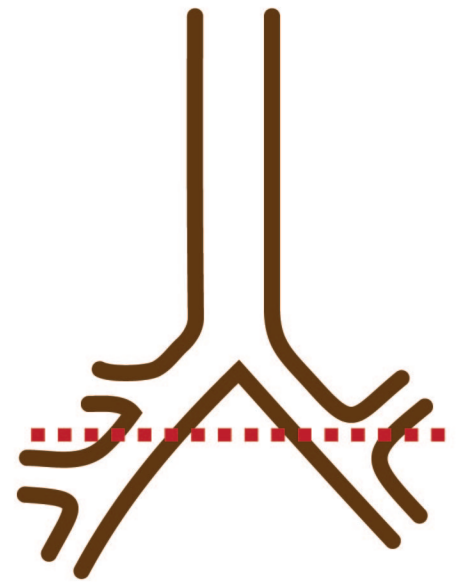
Let's take a closer look at the right bronchus, specifically the right upper lobe bronchus and its 3 segmental bronchi: apical, posterior and anterior. We've added those to our drawing below and labelled another structure, the bronchus intermedius. That is what the right bronchus is called after the upper lobe has branched off, but before the bronchus divides into a middle and lower lobe.

The other lobes also have named segments, but we won't consider them. Onward!



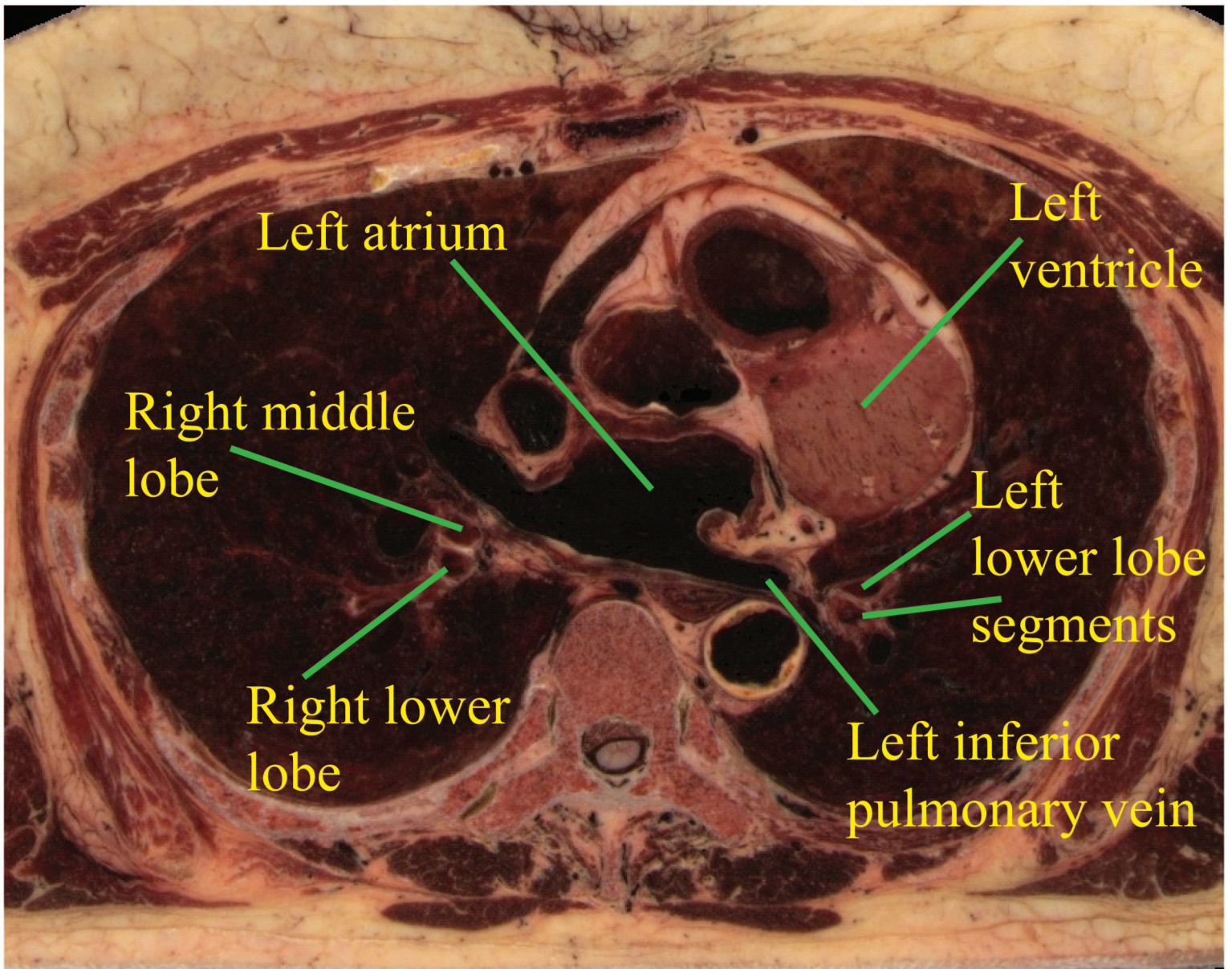
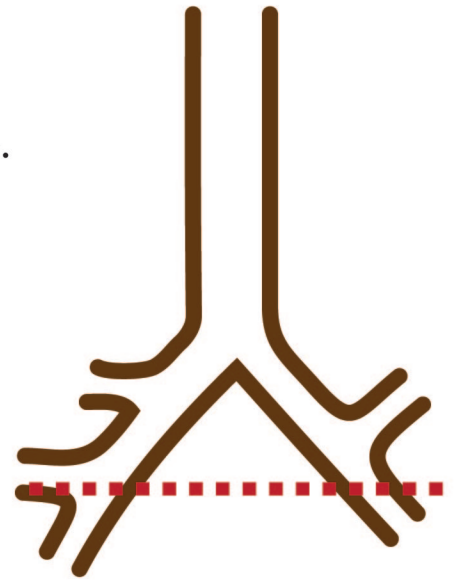


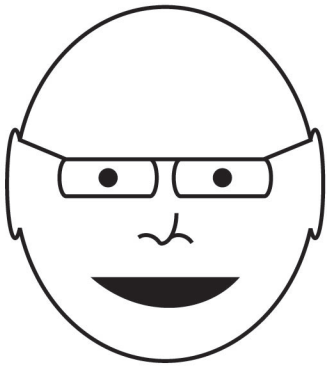
Next, we will look at an image obtained at the level of the bronchus intermedius.



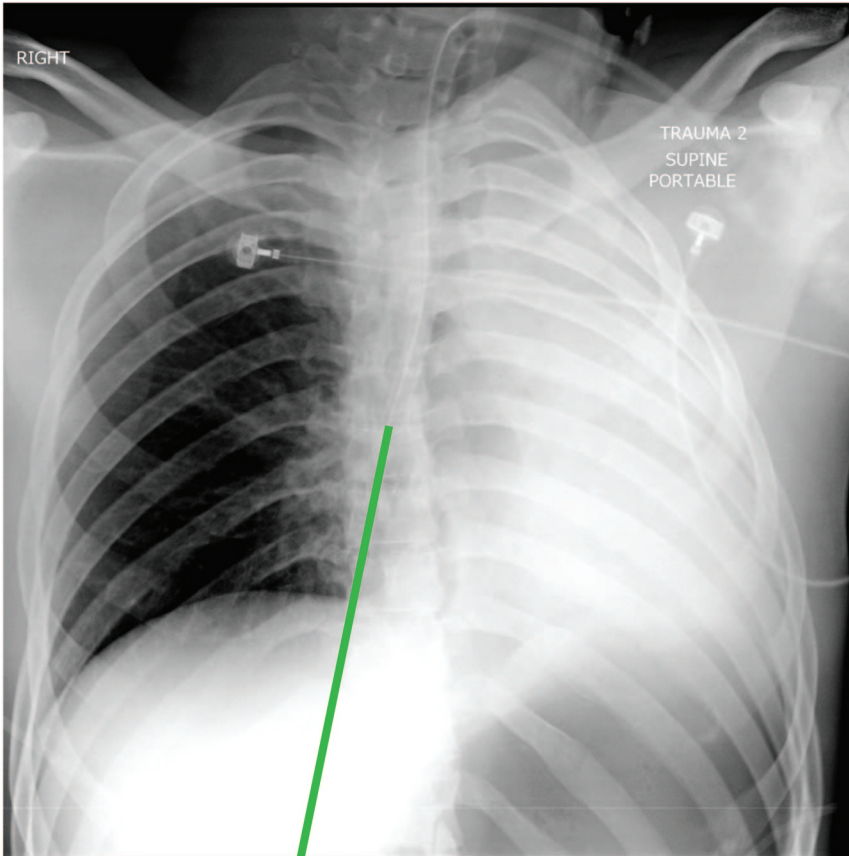


Fially, we have reached the
right middle and lower lobes.





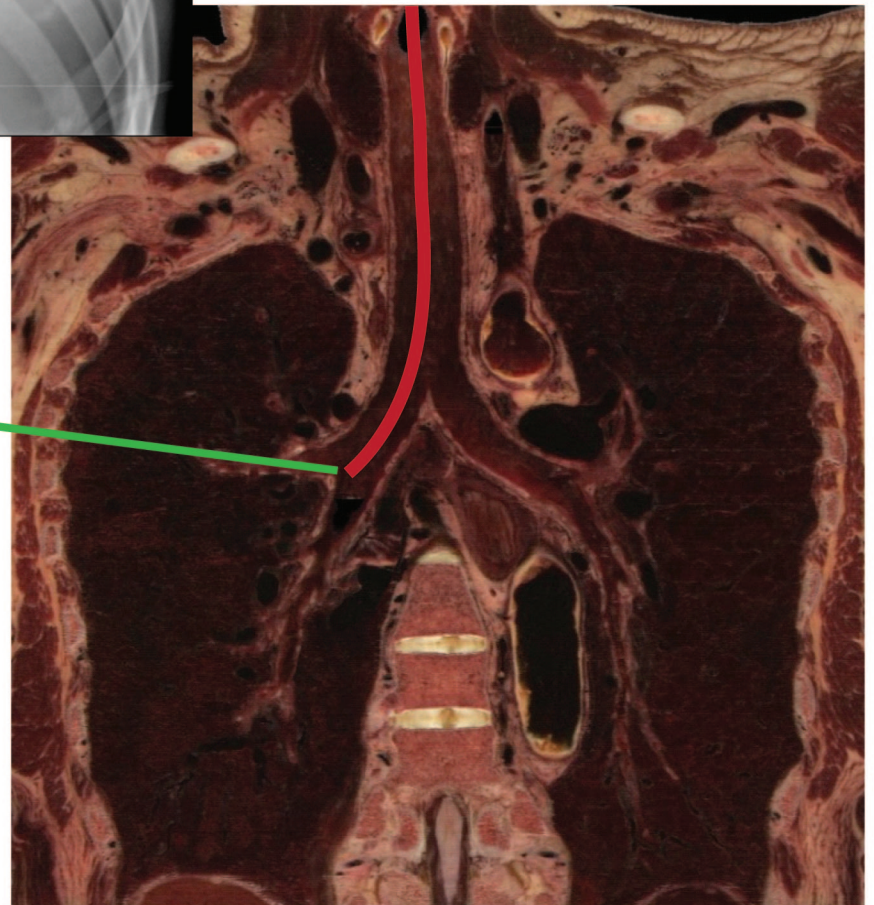
Back to our case. The ETT tip is in the right main bronchus. The right lung fills with air, but the tube obstructs the left main bronchus so no air can get in. The air distal to the obstruction is resorbed and the left lung becomes atelectatic.

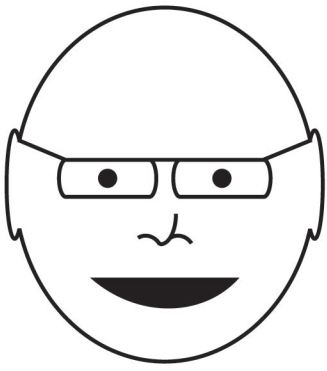


Can you explain it again in English?

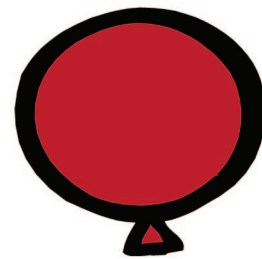
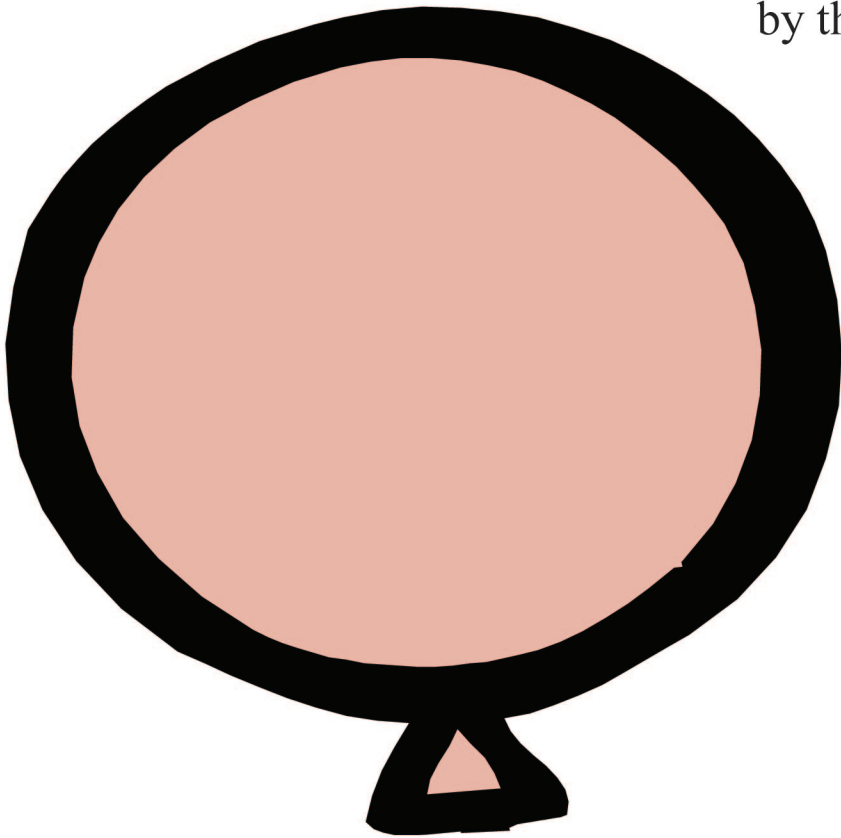


ETT tip

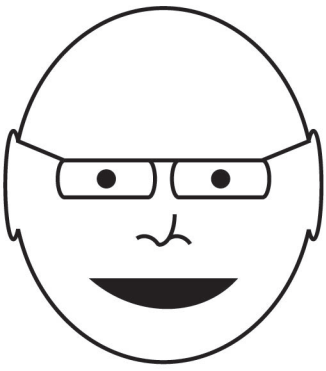




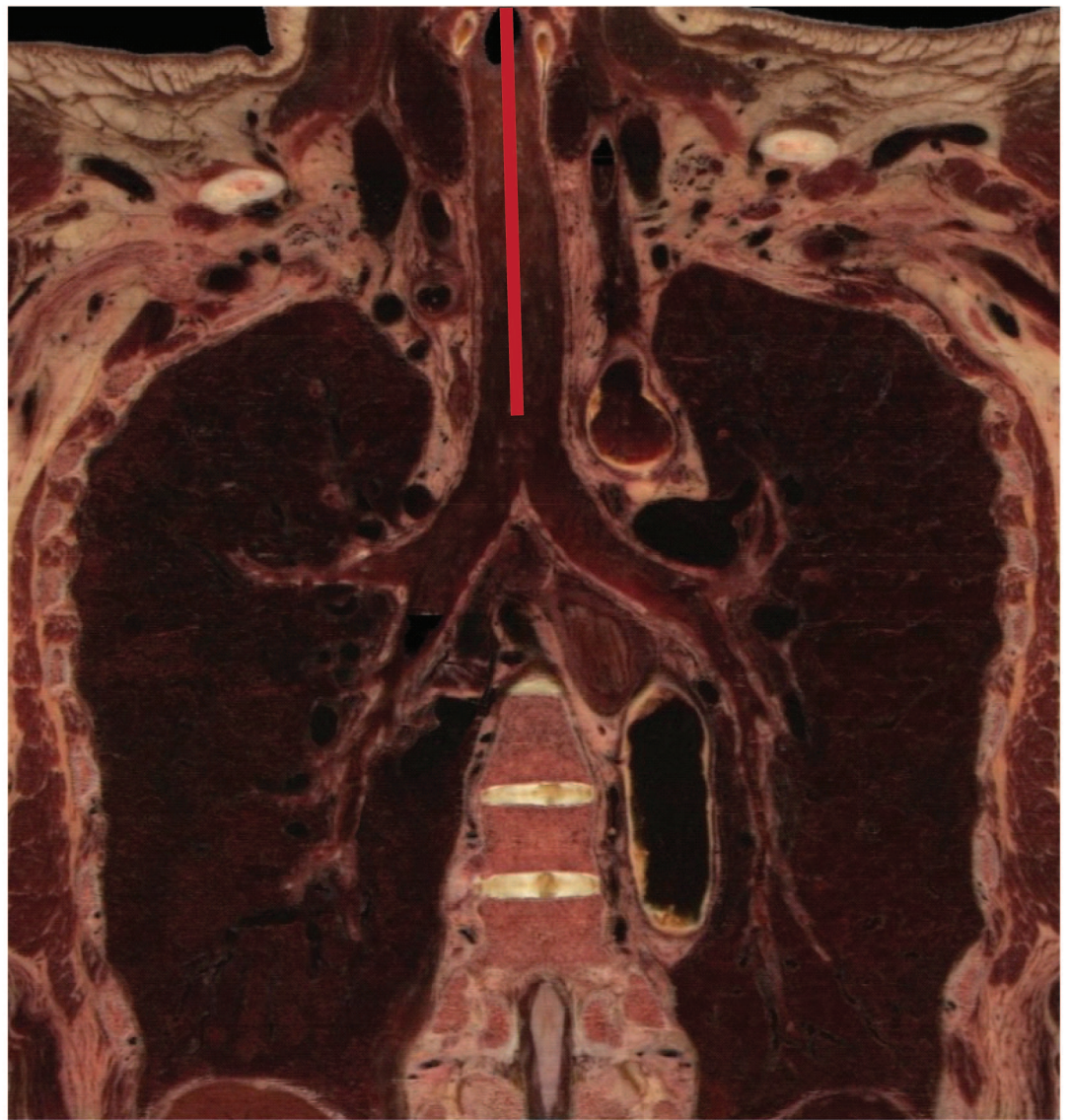
The lung is like a balloon, when it is filled with air, it has increased volume and decreased opacity. When deflated, lungs and balloons both have low volume and increased opacity. Atelectasis is just a fancy term for a deflated airless lung. Lungs without air take on soft tissue density because only the soft tissue parts are left. In our case, no air can enter the left lung because the bronchus is blocked by the ETT.



Much better!

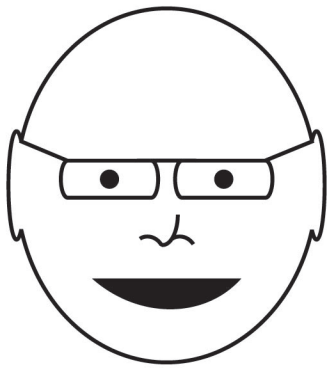


In this case, you can “cure” the atelectasis by pulling the ETT back so that the tip is proximal to the carina, ensuring that air fills and inflates both lungs. One last thing: since the esophagus is directly behind the trachea, occasionally the ETT tube is mistakenly placed in the esophagus. This can be very tricky to recognize on an x-ray, but in our case, the deflation of the left lung caused by the ETT blocking the left main bronchus confirms that the ETT is in the airway.

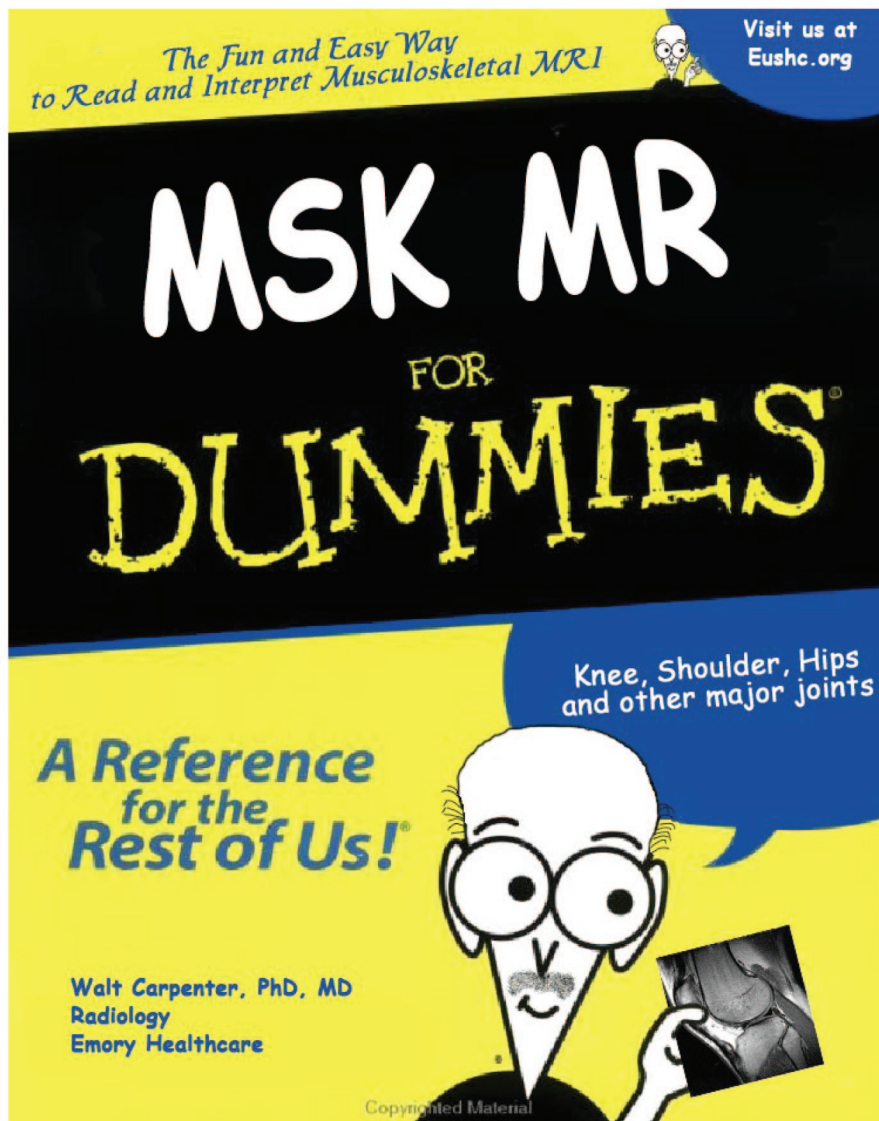


Good deal!





One last thing I want to do is thank Walter Carpenter PhD/MD/Pilot, humble genius and all-round great guy for providing me with the visible human images and a large chunk of the knowledge base and inspiration for producing these comics.



Thanks Walt!!

